STRATEGY RESEARCH PROJECT

FIGHTING THE 20TH CENTURY ARMY INTO THE 21ST CENTURY

BY

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ABSTRACT

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The Army of the future is undergoing a transformation from a forward deployed "Cold War" army to a power projection force. This transition will eventually result in a fully digitized, more tailorable, rapidly expandable, strategically deployable, and effectively employable organization. Until this transformation is complete, it may require a change to our doctrine and to our tactics, techniques, and procedures on how we integrate digitized and non-digitized systems and organizations into the fight. This paper addresses those possible changes. To leverage the true power of the future battlefield, commanders and their staffs must have a clear understanding on the capabilities and limitations that these new systems possess. Our challenge and primary goal of America's Army in this process is to keep the preeminent warfighting skills ready and relevant while the Army evolves into the world's premier 21st Century fighting force.

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> Our object ought to be to have a good Army rather than a large one.
>
> — George Washington

Guided by George Washington's vision, the U.S. Army is responding to the revolution in military affairs with the Force XXI concept. Force XXI is the "reconceptualization and redesign of the force at all echelons…to meet the needs of a volatile and changing world. It will be a force organized around information and information technologies."[1]

Force XXI will be versatile, rapidly deployable, tailorable to the threat, and able to operate seamlessly with the other services.[2] The entire force will be fully digitized and will involve the use of modern communications capabilities to enable commanders, planners, and shooters to rapidly acquire and share information.[3]

Commanders will have a nearly perfect real-time picture of the battlefield. They'll have the tremendous advantage of being able to see themselves and see the enemy, and commanders at all levels will be able to communicate orders nearly instantaneously through digital communications links to all subordinate elements. This improved battlefield awareness and communications capability will revolutionize the conduct and tempo of battle and will give Force XXI the ability to react faster and more effectively than a less technologically advanced enemy.

The Army's newly released digitization timeline reveals that the 4th Infantry Division (Mechanized)'s two brigades at Fort Hood and will be the first in line to get digital gear. These two brigades have served as the service's experimental force (EXFOR) for Force XXI. The first division to be fully digitized on the Division XXI model will be 1st Cavalry Division, also based at Fort Hood, in 2003. After that the process plods along slowly until the last division, 2nd Infantry Division, based in Korea, is fully digitized in 2009.[4] A time span of nearly 10 years in which the Army will not be 100% compatible within its own organization. It will be an even longer time before the Army's digitization effort ever reaches the United States Army National Guard and Reserves. Current plans do not call for the inclusion of the National Guard and Reserves into this transition plan. Similarly, this incompatibility has even greater implications when considering that future operations are going to be more joint and/or multi-national in nature.

The problem consists not of our ability to achieve such an endstate but rather or ability to integrate our forces during this period of transition. As we continue to move through this process, we must continue to ask ourselves how can it effect the future joint task force commander? As outlined in Joint Vision 2010, GEN Shalikashvili said, "The nature of modern warfare demands that we fight as a joint team. This was important yesterday, it is essential today and it will be even more

imperative tomorrow."[5] To achieve integration and interoperability while conducting military operations we must be fully joint: institutionally, organizationally, intellectually and technically.[6]

The Force XXI Campaign Plan lists as one of its nine design principles: "Be effective in war and operations other than war as part of a joint and multi-national team."[7] The intent of this paper is to answer whether or not Force XXI is capable of achieving that principle during this transition period from Force XXI to the Army of 2010 and the follow-on organization Army After Next (AAN). Our doctrine supports such an initiative. Our National Military Strategy states that when called upon to fight and win the nation's wars, the military will fight as a joint force.[8] Therefore, if the Army is to operate successfully in a joint environment with the other services, we must address how well it is doing at building a joint-capable Force XXI? In order to achieve this level of integration we must specifically address how we are going to integrate these newer systems and organizations with the older legacy systems in terms of doctrine, command and control, and resource interoperability.

The following assumptions and definitions are made in order to further define this paper:

- That strategic planning guidance will continue to articulate a power projection strategy, to maintain a limited overseas presence, and to require U.S. Army participation in major regional contingencies.

- The current digitization timeline for new equipment and technology will remain on track through the year 2009. That all divisional units will be fully digitized and undergo a complete change in operating tactics, techniques, and procedures.

- The Joint Staff's Global Command and Control System combines the capabilities of existing command and control systems in a common operating environment and layered architecture.

- Interoperability is the ability of systems, units or forces to provide services to and accept services from other systems, units or forces and to use the services so exchanged to enable them to operate effectively together.

- Jointness is the art of combining capabilities from the different Military Services to create an effect that is greater than the sum of the parts.

During the "Cold War, the Army progressively improved itself in preparing to meet the needs of the future. The majority of that preparation had been focused on specific threats to the United States, enhanced weapons technology, and the evolution of tactics associated with the modern battlefield.

Since the fall of the Berlin Wall, the Army has undertaken an enormous transformation. While remaining trained and ready, it is building a strong and enduring bridge to the future. The real drivers of recent change in the Army are threefold: a changing world order, diminishing resources that are stretched to the limit and the power of the computer and microprocessor.[9]

Evidence of that transformation is everywhere you look. Over the past decade, the Army has been reorganized and restructured into a 21st Century fighting force. Externally, the Army has retained its major commands and the familiar battalion, brigade,

and division structure. Internally, however, it is a fundamentally different force. The Army is redesigning its fighting forces and reengineering its sustaining base. It has redefined its doctrine, experimented with new technologies, and reaffirmed its tradition of selfless service to our Nation.[10] We are a different Army than we were just a five years ago.

None of this has happened by accident. The changes in the Army are the result of a sophisticated campaign plan to move it into the 21st Century, a campaign plan incorporating every element of the Army. The Force XXI Campaign Plan was developed in response to these challenges as an initiative to design organizations and develop capabilities to ensure that the Army was prepared to execute a doctrine of "full-dimensional operations" in the next century.[11]

The Force XXI Campaign Plan incorporates three complementary and interactive efforts. The first and most important effort is focused on the redesign of Army Operational Forces - "Joint Venture." The second and supporting effort is the reinvention of the Institutional Army, that part of the Army that generates and sustains the operating forces. The third part of the Campaign Plan concentrates of the development and acquisition

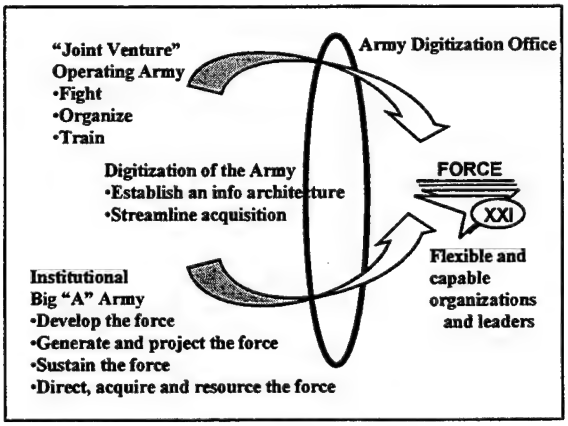

Figure 1 - Campaign Plan

of information-age technologies, particularly our digital communications hardware and the related software needed for information-age battle command.[12]

The Campaign Plan is divided into 3 distinct phases; each focused on a particular echelon (Brigade, Division, and Corps) of the operational Army. The objective of the Campaign Plan is to redesign the Army's tactical forces with emerging technology in the form of digitization, while re-engineering the Army's institutional force by the year 2000, to be fielded by 2010.

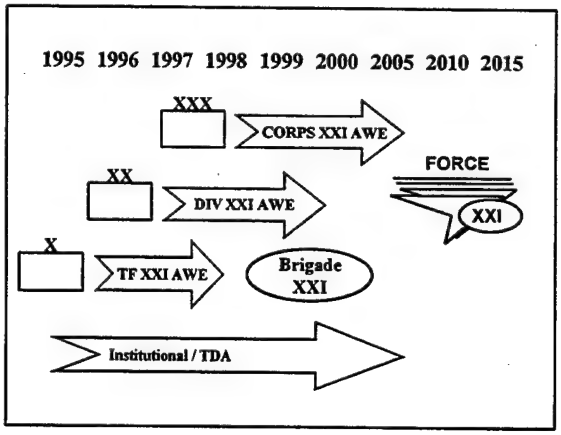

Figure 2 - Timeline

Conducted in a series of progressive cycles, these advanced warfighting experiments (AWE), advanced technology demonstrations (ATD), advanced concept technology demonstrations (ACTD), and advanced concepts and technology II (ACT II) programs will provide insight for interim design decisions

Advanced Warfighting Experiment (AWE)

AWEs are center-of-gravity culminating efforts focused on a major increase to warfighting capability.

Advanced Technology Demonstration (ATD)

A science and technology funded, risk-reducing, proof of principle demonstration conducted in an operational environment rather than in a laboratory.

Advanced Concept Technology Demonstration (ACTD)

A mechanism for intense user involvement in technology assessment and insertion into warfighting systems.

Advanced Concept Technology II Program (ACTII)

A technology program designed to demonstrate proof of principle, high-risk/high-return concepts proposed by industry and academia to support Battle Lab experiments and AWEs.

Figure 3 - Experiments and Demonstrations

and help to design an Army focused on the National security interests of the 21st Century…Force XXI.

The significance of this study to future Army doctrine lies not in the technological advancements themselves but rather in the development and application of appropriate command and control measures as the Army transitions through this period of transformation. As deployments increase and resources decrease there is no doubt where we are headed. Force XXI will act as the spearhead for the land forces commander and will need to be integrated into joint or perhaps even multi-national task forces. The critical challenge for the Army as we transition from Force XXI into the Army After Next is to maintain our vision while growing more capable…

> America's Army, Trained and Ready, a Strategic Force, Serving the Nation at Home and Abroad, Capable of Decisive Victory…into the 21st Century.[13]

But before Force XXI can be properly integrated the following three issues that have serious implications regarding interoperable forces need to be thoroughly explored: doctrine, command and control, and resource interoperability.

DOCTRINE

> Doctrine is the engine that drives change within our Army.
>
> — FM 100-5

Initial Force XXI efforts had concentrated on the development of the Operational Army and the integration of information technology into a doctrine of full-dimensional operations. That doctrine would significantly influence the way in which the Institutional or TDA Army would sustain the Operational Force. The Army recognized that the common linkage between the Operational Army and the Institutional Army was doctrine.[14] However, Force XXI joins the ranks of other notable technological advances (telegraph, telephone, and radio) where technology drives doctrine.

As our technological advances continue, three primary documents have emerged and continue to guide the Force XXI Campaign efforts; Department of the Army (DA) Pamphlet (PAM) 100-1, Force XXI Institutional Army Redesign; Training and Doctrine (TRADOC) PAM 525-XX, Force XXI Division Operations Concept; and

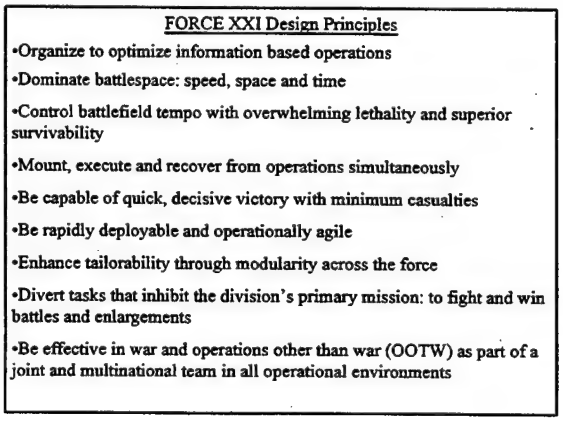

Figure 4 - Design Principles

TRADOC PAM 525-5, Force XXI Operations. These documents focus their efforts in meeting the FORCE XXI design principles.

DA PAM 100-1, Force XXI Institutional Army Redesign, provides a vision of and conceptual framework for the evolutionary design of the Institutional Army. It defines the institution's core capabilities and related processes and discusses those in the context of the 21st century. This document postulates design principles and models for future major commands and institutional support, and promotes redesign and reengineering of the Army to leverage strategic factors and technologies in seeking common doctrine and structural reform.[15]

TRADOC Pamphlet 525-XX, Force XXI Division Operations Concept, is the first of the emerging doctrinal pamphlets to apply the principles advocated by TRADOC PAM 525-5. It provides an operations concept as a basis for development of Force XXI Divisions.[16]

TRADOC PAM 525-5, Force XXI Operations, outlines a doctrine of full-dimensional operations for the new strategic Operational Army. It recognizes an environment absent of fixed strategic conditions and one that relies on learning and understanding the principles of war. It serves as a baseline for more definitive concepts and considers scenarios that represent the full spectrum of war.[17] TRADOC PAM 525-5 is a capstone document providing the Army with an intellectual stepping stone to solving our future problems.

With joint operations becoming more of the norm rather than an anomaly, doctrinal disagreements among the services are going to occur and will be difficult to change. The joint force commander must be concerned that his component commanders, in particular the land component commander (if designated), fully understands exactly what he wants, where he wants it, and when he wants it. Even though Force XXI is innovative, and clearly gives the United States huge technological advantages over its adversary, if the Joint Task Force commander can not take advantage of this technology through a synergistic employment of his forces, then it's existence is for naught. The constant theme that is inherent in the new doctrine is adaptability and versatility, a must for a joint task force commander.

In TRADOC PAM 525-5, Force XXI Operations, the conceptual source of Force XXI, there is reference to jointness in Chapter 3, the title of which is "Future Land Operations." This reference discusses the importance of ensuring that the Army of the future has joint connectivity.[18] There is some additional mention of jointness in the manual's description of the battle dynamic of "Battlespace", which is truly a joint concept. TRADOC PAM 525-XX, Force XXI Divisions Operations Concept is the first emerging doctrinal pamphlets to apply the principles advocated by TRADOC PAM 525-5.

TRADOC PAM 525-XX provides an operations concept as a basis for development of Force XXI divisions. As such, it warns that

"while the initial design of the fighting force is centered around the division, the very concept of what a current division is or does may be altered significantly."[19] Hence, the pamphlet provides the charter for experimenting with design at the division level.

Although the pamphlet discusses joint Force XXI requirements and aspects, it does not do so in sufficient detail to enhance jointness. TRADOC and the Future Battle Directorate that authors this pamphlet recognize this fact, and agree that "…the most glaring omission is a full discussion of how the Army works with the other services."[20] The pamphlet's authors also ask themselves important questions that reveal their concern with jointness and desire to keep the Army on track with what it can do to increase joint capability.[21]

This next evolution of doctrine assumes there will not be a return to the prescriptive strategic framework forged against a single threat but rather a strategy of principles to be applied in given circumstances. The next evolution of doctrine will continue the evolution of full-dimensional operations into Force XXI operations, as the increasing impact of information-age technologies is combined with quality soldiers and leaders in the United States Army. Reflecting advances in weapons and information technology, this concept achieves force coherence through shared knowledge.[22]

COMMAND AND CONTROL

> Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur.
>
> — Giulio Douhet

Any commander, whether in a joint task force or unified command, needs to know the situation as it occurs. Up-to-date information is essential in order to make a decision that could influence the outcome of the battle. Force XXI does offer improved situational awareness based on superior knowledge of the friendly situation and location, enemy situation and location, and events shaping the overall battlespace.[23]

Force XXI will enable the commander to see the battlespace prior to engagement reducing the need to consolidate prior to maneuver and, in-turn, lowering the risk of detection by the enemy. Detection of the enemy by sensors from positions with ample cover and concealment and engaging him when necessary allows for an empty battlefield[24], therefore reducing risk of casualties. It is the warfighter's timely receipt and methodical application of information that increases his lethality. If information is wisely employed Force XXI warfighters have the capability to revolutionize information in ways their predecessors never could conceive. Until this transformation process is complete our challenge will be to determine how to provide the same level of information throughout the command.

The primary method of maintaining information superiority is through the Army Battle Command System (ABCS). The ABCS was conceived to field a vertically and horizontally integrated force that would allow warfighters to share a common battlefield view.[25] The ABCS permits commanders at every level to share a common, relevant picture of the battlefield geared to their level of interest and tailored to their special needs. This common picture will greatly enhance force level dominance by enhancing situational awareness and ensuring rapid, clear communication of orders and intent, potentially reducing the confusion, fog, and friction of battle.[26]

Additionally, Force XXI technology is compressing the time and space dimensions of command and control. The introduction of this technology will increase the speed and tempo of future battles allowing commanders to make instantaneous decisions while accepting some degree of uncertainty. The speed in which information is obtained from this new technology will mean a major overhaul of the battlefield from the individual rifle squad to the corps support command. Speed and precision engagement will reduce our need for a large build-up, thus reducing the footprint that was needed for industrial age forces.[27]

For example, improved command and control based on focused, all source, real-time intelligence will reduce the need to assemble maneuver formations days and hours in advance.[28] Therefore, they can dominate battlespace by synchronizing combat

operations, concentrating force effects and preventing fratricide.

To this end, ABCS provides the digital communications among strategic, operational and tactical headquarters, down to the individual soldier/weapon system level. Three subordinate battle command systems interoperate within ABCS:[29]

- Global Command and Control System - Army (GCCS-A): the battle command system located at strategic and theater levels. It Provides a seamless Army extension from the strategic Global Command and Control System (GCCS) to echelons-corps-and-below (ECB).[30] GCCS-A interoperates with other theater, joint and multinational command and control systems.

- Army Tactical Command and Control System (ATCCS): this enhances the battle command capabilities by synchronizing the respective battlefield functional area (BFA) systems.

- Force XXI Battle Command Brigade and Below (FBCB2): the battle command system that operates at brigade level down to the soldier/platform level.

The introduction of this technology will increase the speed and tempo of future battles allowing commanders to make instantaneous decisions while accepting some degree of uncertainty over further analysis.

As the Nation's full service land force, the Army should be selected as the executive agent for all land warfare in an effort to combine this technology with the other services. This action will consolidate all efforts into one centralized service which will hopefully reduce redundant efforts by other services. As the Army deems necessary they could then task specific land warfare missions to other services that they felt more capable of

handling (for example, mine warfare to the Marine Corps). This sharing of effort would focus the other services attention on land warfare and surface practical issues through synergistic cooperation.

All services must start thinking beyond the Joint Task Force (JTF) as an ad hoc unit that is organized solely for a special mission and then relegated back to their service units once the mission is complete. With the rate at which new technology is being introduced into the services, this joint "think" needs to be exercised daily so it becomes routine.

Emerging command and control doctrine requires the concept for modularity to ease the friction of command and control in a joint and/or multinational operation. TRADOC PAM 525-5 provides the conceptual framework for changing the Army into a knowledge-base, power projection force prepared for the command and control challenges of the 21st century. The authors of Force XXI recognize that continuity and change are endemic to Army doctrine. For example, the Force XXI concept links modularity to task organization, stating that:

> The missions we receive today cause us to reconfigure and tailor our forces. This "task organization" is an inherent Army capability that we are enhancing by creating more modular forces that can be more readily configured for a wide variety of missions. We must be able to generate an effective, decisive force from diverse elements without undermining the capability of units that stay behind.[31]

Modularity preserves continuity with emerging doctrine by linking itself to task organization with "cut and paste" combat, combat

support, and combat service support organizations, thus providing a new method of enhancing a proven concept. Tailorability is the process of determining the right mix and sequence of units. Modularity and tailorability mutually support one another. Flexibility to operate in joint and multinational environments is one of the tenets of modularity.

Force XXI offers the commander some unique challenges to better command and control his battlespace in terms of information superiority and unit organizations. Despite all the advances in information technology commanders will never have perfect knowledge of the operational situation surrounding them.[32] As information technology becomes integrated throughout our services the hope for the future will be that it can reduce the fog and friction of battle.

RESOURCE INTEROPERABILITY

> Technology applied without connectivity provided by theoretical concepts will be insufficient to achieve victory over an opponent who has superior operational or tactical concepts, even if he does not possess the most modern weapons.[33]
>
> Naval War College
> August 1996

Regardless of the technological gains one must use caution when considering that technology cannot solve our military challenges. Resource interoperability is the ability of the services to cross level equipment, personnel, material, and information to successfully complete the mission. This raises the question, why would a JTF commander have to worry about the Marines cross-leveling to the Army? The most obvious answer is a reduced logistical tail for each service, thus reducing the overall JTFs sustainment requirement. But of more importance here is the operational factor of time.

> "Time spent trying to learn and engineer just the (comparatively) few systems we were associated with during Operation Restore Hope could have been better spent providing higher quality, overall service. Money spent on these circuits could have gone a long way to resolving our interoperability problems."[34]

Our initial focus is on making all of today's systems compatible. By inserting digital technology in multiple platforms, we can enable our major combat systems to share real-time data on the battlefield, while avoiding the "mission impossible" of replacing entire combat systems. Future systems will be required to adapt non-proprietary, open architectures.

We are buying capabilities, not systems, that fit horizontally and vertically throughout the entire force. Our ultimate goal is the seamless integration of all Army and joint information systems.[35]

The Army Digitization Office (ADO) is the most technical of the three Force XXI axes and is responsible for the integration of new digital technology into the Army. The ADO has a solid campaign plan that is directly linked from the resource interoperability requirements published by the Joint Staff to Army Digitization and command and control systems. The Joint Interoperability Directive written by the Joint Staff, "C4I for the Warrior," is derived from joint interoperability requirements and creates a broadly connected joint command and control system.[36] The ADO's task is to ensure that the Army's C4I capability "…is in compliance with the Joint Staff's 'C4I for the Warrior' concept."[37] The ADO does this in four ways.

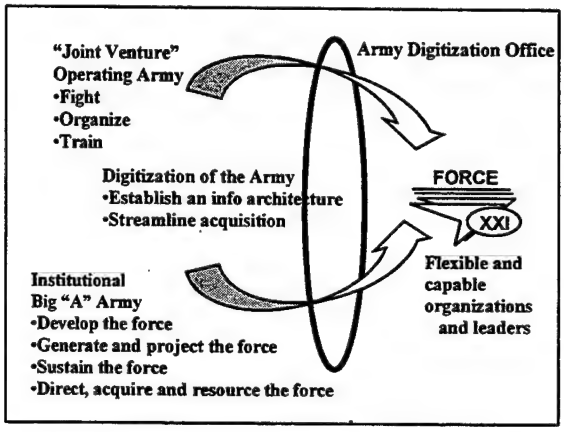

Figure 5 - ADO Linkage

First, it ensures that the basic digital means of information flow (operational, technical information, and system architectures) are coordinated and are totally interoperable with those of the other three services.[38] Then, the ADO designates four areas (acquisition, internet, integration, and future), each

of which is totally interoperable in its own effort. For example, the acquisition area entails the purchase of enhanced digital systems for application to select platforms of the Marine Corps and Air Force to participate in Advanced Warfighting Experiments.[39] All four areas of the plan are executed in an environment of joint interoperability.[40] The joint focus of the ADO is critically important since the ADO has broad authority to coordinate with industry and to procure equipment that is fully joint compatible. The Army Digitization Office is fully immersed in the joint resource interoperability effort. Force XXI technology integration throughout the services will enable our forces to derive a common understanding of the operational environment.[41]

The hardest interoperability problem to solve is that of equipment, especially information systems. During Operation Restore Hope there were at least ten different data systems, most built around the requirements of a single service, but handling a host of common functions: intelligence, personnel, logistics, finance.[42] Each system brought its own logistical tail and required its own lane on the very narrow information highway available to deployed forces.[43]

Not only do you have to have the equipment to communicate with the other services to function as a JTF, you also must have the specific personnel to accompany the equipment. To truly achieve joint readiness the combatant command or JTF staff must

have immediate access to the right technical experts with the right equipment. Having to train the personnel during the mission takes valuable time away from the mission. Therefore, experts who come from the various services must possess the proper mix of skills to bring together the array of available intelligence, surveillance, and reconnaissance (ISR) capabilities.[44]

To date, however, the Army Force XXI effort has not fully incorporated the mechanisms to produce a 21st century Army that is fully joint capable.[45] However, one step in the right direction was the Army Air and Missile Defense Command (AAMDC)/Air Operations Center (AOC) Operations. The AAMDC is an Army organization that performs critical theater level air and missile defense planning, integration, coordination, and execution for the Army Forces (ARFOR) Commander and the Joint Forces Land Component Commander (JFLCC). That system provided the latest in space based technology, the first command and control element that seamlessly integrated all theater missile defense (TMD) functions to protect the joint force from the growing ballistic missile threat.[46] The AAMDC/AOC harnessed the power of national, theater and tactical sensors and enabled the JTF and land component commanders to see the battlefield in real time. Furthermore, it synchronized TMD operations-air, land, sea, and special operations-faster and more effectively than ever before, and in a compact, easily deployable format.[47] The AAMDC

supports the five characteristics of Force XXI (doctrinal flexibility, strategic mobility, tailorability and modularity, joint and multi-national connectivity and the versatility to function in any theater of operations) to achieve decisive results in future operations.

RECOMMENDATIONS AND CONCLUSION

> …the real challenge is not to put a new idea into the military mind but to put the old one out.
>
> — Sir Basil Liddell Hart

None of the services, and certainly not the Army, can afford to undergo a process of significant change and yet fail to produce a more interoperable and joint-capable force in the process. The following three sections provide several recommendations in mitigating the risk associated with this transformation to a 21st Century Army.

Doctrine

The Army must include far more emphasis on the joint nature of future Army operations in its literature and especially in the Force XXI publications. As a previous Chairman of the Joint Chiefs of Staff, General Shalikashvili accused the services of doing the easy things to become more joint, but not doing the hard things.[48] More recently, the Chief of Staff of the Army, General Reimer stated, "Clearly our doctrine will have to be updated…."[49] If jointness and interoperability does not appear consistently and frequently in the literature, then perhaps it is not an important concept after all.

Our doctrinal literature lacks the specificity needed to interoperate and fight in a joint environment. Concerted efforts to rewrite our current doctrinal manuals to reflect greater

emphasis and specificity on how the Army is to operate as part of a joint and/or multinational force must be addressed. The specificity needs to center around the issues and responsibilities of the land component commander and how Army forces will work alongside or attached to the other services. Service parochialism must be eliminated.

The Army must continue to support Atlantic Command (ACOM) as the executive agent for all joint warfighting efforts. Through their efforts a consolidated cell of joint services and civilian agencies could continue to work with organizational and doctrinal developments in the formulation of standing Joint Task Forces.

In order to set the tone for doing the hard things we must start training the leadership of the 21st Century by cross fertilizing our younger leaders. One way to achieve such an objective is to standardize the core teaching curriculum of all service schools from advanced courses to senior service colleges. Thereby ensuring a common basis of instruction and learning in regards to interoperability and jointness.

For the services not to be in concert with one another during this time of uncertainty does not bode well for the conduct of future operations and for the effective utilization of increasingly scarcer resources.

Command and Control

To help facilitate this, established JTFs needs to be organized permanently under a specific Army corps or division to

take advantage of the units standing staff and pre-existing logistical structure. As the mission arises, the corps/division commander can then tailor his forces to meet the mission. More importantly all the land forces (Army, Marines, Special Forces, etc) would be task organized full time reducing the need to familiarize each service with the other. Planning considerations for these operations must take the capability differentials into account immediately and make necessary adjustments in force composition. Unfortunately, without changing the existing law, this would have tremendous administrative and parochial hurdles to overcome.

Technical expertise requirements will increase the need for specialized skills, personnel and equipment. The number and variety of Army specialists (for example, computer technicians and local area network managers) and foreign language linguists will need to increase to offset the technological advances that our equipment brings with it. The greater use of automated translation software for written communications will also need to be employed to better enhance the Global Command and Control System - Army (GCCS-A) with the overarching Global Command and Control System (GCCS).

The role of the liaison officer and the liaison team is going to take on a greater role during this transformation period. In the area of liaison, expanded training and professional education must improve liaison team understanding of partner-army

organization, equipment, and doctrine or civil agency procedures. Liaison teams with significant technical capabilities to ensure full sharing of information necessary to fully utilize each participant's capabilities.

In order to maintain command and control with the National Guard and/or the Reserves, the command and control equipment must be designed to maintain a "backwards compatibility." This would allow non-digitized or older legacy systems to continue to interact with the newer fielded systems. Based on the current fielding plans this would also allow the Guard and Reserve to operate within the proposed command structure of the future.

Resource Interoperability

The short term solution to remedy interoperability difficulties/differences is by hard working liaison officers from other services working in conjunction with Force XXI ensuring that all their needs are being surfaced during the initial testing and experimentation. While the use of LNOs is being done, it also needs continual reinforcement and backing from the service chief level of visibility.

The long term solution is having the Joint Requirements Oversight Council (JROC), chaired by the Vice Chairman of the Joint Chiefs of Staff, focus the services on the mission and allocate the funding for needed technology without service redundancy. Eliminate "stove-pipe" technology. The opportunity to cross-level the forces currently exist with Force XXI. All

services need to surrender their service pride and combine efforts towards information systems that are interoperable. With the rapid evolution of commercially developed information age technology it won't be long before it is available to potential enemies. Therefore, it is imperative that services act quickly to combine efforts to obtain maximum results from Force XXI.

This study has shown that Force XXI is part of the Army's answer in how to deal with a changing world environment. Information-age technology will allow the United States a decided advantage over future potential enemies.

While the Army is making a valiant effort to adhere to interoperability and jointness, it is not clear that these terms are firmly embedded in its collective consciousness, nor does it appear to be firmly embedded into the design and structure of Force XXI as is could be.

The Army has assumed the initiative in taking control of change and making it work for it rather than allowing itself to fall into the historical trap of resting on its laurels and preparing to fight the previous war. Force XXI is a dynamic and farsighted initiative. It is firmly grounded in the National Security and Military Strategy of the United States and is in consonance with the values, interests, and objectives of the country. Force XXI is a solid concept that is now deeply embedded into the structure and process of the Army. The Force

XXI Campaign Plan is well-designed and will help produce the best possible Army that time and resources will allow.

To date, however, the Army Force XXI effort has not fully incorporated the mechanisms to produce a 21st century army that is interoperable and fully joint-capable. The intent was to have all the digital enablers in place…and we don't have the enablers in place.[50] As Force XXI progresses over the next 10 years, the Army must continue to make itself a truly interoperable and joint-capable force.

By 2010, the battlefield will be fully "digitized." The incorporation of digital technology across all of our battlefield systems will give commanders unprecedented capability to gather and share tactical information. The leaders of 2010 will be masters of information technology. The acceleration of technology as we approach the 21st century may be daunting to us, but for the leaders of 2010, information technology will be interwoven into the fabric of their lives.

For the next ten years we will assume risk as we make this transition to a digitized and fully interoperable fighting force. Until such time, we can only make slight modifications to our doctrine, command and control techniques, and resource interoperability in order to mitigate that risk and ease our Army into the 21st Century.

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